

REMARKS

Claims 1-22 are pending, with claims 2, 4-6, and 22 rejected, and claims 1, 3, and 7-21 withdrawn from consideration.

The Examiner has maintained the rejection of claims 2, 4-6, and 22 under 35 USC 103(a) as being unpatentable over Tauchi (U.S. Patent No. 5,966,939) in view of Hayes (U.S. Patent No. 6,077,380), and the rejection of claim 4 under 35 USC 103(a) as being unpatentable over Tauchi in view of Hayes and Kuramoto (U.S. Patent Publication No. 2001/0020744).

Claim 2

Independent claim 2 has been amended to recite that "at least one soldering layer made from a solder comprising a eutectic mixture of gold and bismuth and a bismuth layer for producing a soldered joint with to a gold layer."

Tauchi teaches a multilevel thermoelectric cooling device composed of at least two cooling units. A first cooling unit includes a thermoelectric element bonded by a first solder to the corresponding electrodes. The second cooling unit is mounted on the first cooling unit and includes a thermoelectric element as well bonded by a solder to the electrodes. The solder includes preferably a eutectic mixture of the tin and lead family.

However, a component with a soldering layer including a eutectic Bi/Au mixture and a bismuth layer, as recited in amended claim 2, is neither disclosed nor obvious in view of Tauchi.

Hayes describes solid spheres coated with a low melting material and a method of forming those spheres. The spheres are used for instance as a solder for joining

arrays, for instance in microelectronic devices (see Figure 6 of Hayes). Preferred materials are copper as the high melting point material and a solder, e.g. bismuth or gold, as the low melting point material.

Although Hayes teaches a component having a soldering layer including a eutectic mixture of Gold (Au) and Bismuth (Bi), it does not disclose a component which has beside this layer a further bismuth layer for producing another soldered joint to a gold layer. The specific composition of the component according to claim 2 enables the production of multilayered structures.

Therefore, a component with a soldering layer comprising a eutectic Bi/Au mixture and a bismuth layer, as recited in claim 2, is not disclosed or obvious by the teaching of Hayes.

Further, a combination of the teachings of Hayes and Tauchi would not lead a person skilled in the art to the component recited in claim 2, since a combination of the cited documents does not suggest a component including a soldering Au/Bi-layer as well as a bismuth layer.

Claim 4

Kuramoto relates to a method of forming a solder film on a metallic surface. This is achieved by depositing tacky substrates such as benzotriazole or imidazol derivatives on the metallic surface followed by applying the solder. The solder then is molten under formation of thin solder film. Examples for solders are eutectic bismuth alloys [0063-0065]. The used solder particles have sizes of 1 to 500 μ m [0062]. The formed solder film possesses a thickness between 5 to 200 μ m (claims 1 and 4 of Kuramoto).

However, Kuramoto does not suggest a component having a Au/Bi-soldering layer and a bismuth layer for producing a further soldered joint.

The component recited in claim 4 thus is also not disclosed or obvious in light of Kuramoto.

Claim 5

Independent claim 5 has been amended to recite “wherein the thermoelectric material of each of the at least two substrates is alternately spaced between the thermoelectric material of the other of the at least two substrates.” That is, amended claim 5 is directed to a microelectromechanical device including at least two components joined by a eutectic Au/Bi solder, whereby at least one component is made of two substrates also joined by the Au/Bi solder and each substrate has a thermoelectric material facing the other substrate arranged thereon.

Furthermore, the thermoelectric material of each of the at least two substrates is alternately spaced between the thermoelectric material of the other of the at least two substrates. This feature is for instance disclosed in Figures 6A, 6B, and 7, and the corresponding description of the application.

Tauchi teaches a component made of at least two substrates joined by a solder, whereby each substrate has a thermoelectric material arranged thereon.

Though the thermoelectric material extends to and might be therefore in contact with the other substrate, the thermoelectric material according to Tauchi is not alternately arranged between the thermoelectric materials of the other substrate. Rather, the thermoelectric material according to Tauchi is arranged as a singular layer on each substrate and then is bonded to a further substrate. There is no alternating

arrangement of the thermoelectric material on the substrate and also no alternating special arrangement of the thermoelectric material of the one substrate between the thermoelectric material of the other substrate.

Hayes teaches the use of a eutectic Au/Bi mixture as a solder, but does not suggest a device according to amended claim 5.

Also, combining the teachings of Hayes and Tauchi would not lead a person skilled in the art to the device recited in amended claim 5, because Tauchi simply does not disclose such a device with the specific feature that the thermoelectric material arranged on the substrate is facing each other.

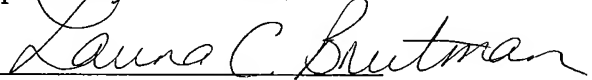
Therefore amended independent claim 5, as well as dependent claims 6 and 22, are not anticipated or obvious in view of Tauchi and Hayes.

Reconsideration and withdrawal of the prior art rejections in therefore respectfully requested.

In view of the above, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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